REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 10-26 are pending in the present application, Claims 10 and 22-24 having been amended, and Claims 25-26 having been added. Support for the amendments to Claims 10 and 22-24 and new Claims 25-26 is found, for example, in the originally filed specification. Applicant respectfully submits that no new matter is added.

In the outstanding Office Action, the title of the invention was objected to; the abstract was objected to; the drawings were objected to; Claim 24 was rejected under 35 U.S.C. §112, second paragraph; Claims 10-12, 14-16, 18-20, 22, and 23 were rejected under 35 U.S.C. §103(a) as unpatentable over Jung (U.S. Patent No. 5,590,946) in view of Lahos (U.S. Patent No. 5,584,561); Claim 24 was rejected under 35 U.S.C. §103(a) as unpatentable over Jung in view of Lahos, and further in view of Szaniszlo (U.S. Patent No. 5,803,574); and Claims 13, 17, and 21 were objected to for depending from a rejected base claim, but were otherwise indicates as including allowable subject matter.

Applicant thanks the Examiner for the indication of allowable subject matter.

With respect to the objection to the title, the title is amended as suggested in the outstanding Office Action. Applicant respectfully requests that the objection to the title be withdrawn.

With respect to the objection to the Abstract, a new Abstract is provided which is substantially similar to the Abstract proposed in the outstanding Office Action. Applicant respectfully requests that the objection to the Abstract be withdrawn.

With respect to the objection to the drawings, this objection is respectfully traversed. The outstanding Office Action takes the position that Figs. 1, 9, and 11 all show reference character 77 as indicating different parts. Reference character 77 is used in the specification

to indicate a reflector. Fig. 1 of the present application shows a first embodiment of the invention, and shows reflector 77.[1] Fig. 9 of the present application shows a perspective view showing the structure of the headlamp according to the first embodiment of the invention, and shows reflector 77.[2] Fig. 11 of the present specification shows view of the condenser lens used in the headlamp according to the first embodiment of the invention, and shows reflector 77.[3] Thus, Figs. 1, 9, and 11 all show portions of the first embodiment, and all show that reference character 77 indicates the reflector of the first embodiment. Thus, Applicant respectfully requests that the objection to the drawings be withdrawn.

With respect to the rejection of Claim 24 under 35 U.S.C. §112, second paragraph, Claim 24 is amended to change "and/or" to "and." Applicant respectfully submits that the rejection of Claim 24 under 35 U.S.C. §112, second paragraph is overcome.

A non-limiting embodiment of the claimed invention provides a non-contact power-generation bicycle headlamp having a luminous intensity sufficiently reaching a practical level of use by appropriately determining the positions of the magnets disposed on the spokes of a wheel of a bicycle and a coil disposed on a frame of the bicycle, and circuit constants corresponding to a predetermined speed at which a person rides the bicycle.

When the bicycle travels, the wheels turn, rotating the rotor including the magnet plates disposed at particular spacings on the wheel spokes. This induces an electromotive force intermittently in the power-generating coil of the stator. When the magnet plate of the rotor faces the power-generating coil of the stator, power is generated. When the space between the magnet plates of the rotor faces the power-generating coil of the stator, no power is generated. The bicycle headlamp and the headlamp electrical circuit are configured so that the power-generating coil of the stator and the resonance circuit formed of the power-

[1] Specification, page 6, lines 12-15.
[2] Specification, page 8, lines 1-4.
[3] Specification, page 8, lines 9-14.

generating coil and the capacitor establish series resonance at the standard speed (15km/h) of the bicycle. Therefore, the electromotive force induced in the power-generating coil 53 becomes as indicated by plot (a) in Fig. 18 of the present application. As shown in Fig. 18, the electromotive force surges while the speed increases from a low level to the standard level, and the increase in electromotive force becomes moderate after the standard speed is exceeded.

Embodiments of the claimed invention have the following advantages over the conventional devices. The contactless generator enables power to be generated without frictional resistance, which is encountered by the conventional roller-type dynamo, and the cyclist's power needed during cycling can be significantly reduced. The capacitor is connected in series with the power-generating coil in order to establish series resonance at the standard cycling speed of the bicycle, with the result that the efficiency of power generation of the bicycle headlamp according to the present invention is 50% higher than that of the conventional non-resonant bicycle headlamp. Because the resonance frequency is specified corresponding to the standard cycling speed (15 km/h), the power generated at a cycling speed exceeding a certain level can be suppressed. The current is suppressed accordingly, and the light-emitting diodes can be protected

With respect to the rejection of Claim 1 as unpatentable over Jung in view of Lahos, Applicant respectfully submits that the amendment to Claim 1 overcomes this ground of rejection. Amended Claim 1 recites, *inter alia*, "a headlamp electrical circuit comprising a resonance circuit formed of the power-generating coil of the stator and a capacitor connected in series with the-power-generating coil, and having, as a resonant frequency, a power-generation frequency determined by the positions where the magnets and the power-generating coil are disposed, when the bicycle is pedaled at a predetermined speed."

The outstanding Office Action acknowledges that Jung does not disclose a circuit including a resonance circuit.[4] Thus, Jung does not disclose or suggest the above-noted features of amended Claim 1.

As a headlamp for a bicycle, an object of the claimed invention is to provide a steady light emission that has a luminous intensity level practical for bicycle lamps. To verify that the claimed invention is sufficiently effective in a practical sense, the Applicant had a product embodying the claimed invention to check the correlation between the power-generation frequency and the output current obtained as the frequency, with respect to the standard speed of about 15km/h and the wheel size (in inches) of a bicycle to which the product was mounted (See Evidence (a) filed herewith). The Applicant also had the Japan Vehicle Inspection Association, which is an inspection foundation for checking bicycle safety and other matters, to test the product as a bicycle headlamp in a practical use (see Evidence (a)). The Japan Vehicle Inspection Association performed a test on model type ML1 on March 5, 2001, and issued a certificate (See Evidence (b), filed herewith) that states the product conforms to JIS C9502.

As understood from the attached Evidence (a) and (b), a power generation frequency of about 70Hz was obtained at a standard speed of about 15km/h, and an output current of 27 to 30mA was obtained at that frequency. The magnitude of this output current means that the product sufficiently satisfies the JIS requirements for bicycle headlamps and sufficiently reaches a practical level of use.

On the contrary, Lahos uses light emitting diodes. From the fact that the light emitting diodes are used as a tail lamp, a person of ordinary skill in the art would determine that the diodes have a low luminous intensity level and are not practical for headlamps. Further, Lahos discloses chip 212, which causes light-emitting diode 36 to blink according to

[4] Office Action, page 8.

the output of diode 210. Chip 212 turns on light-emitting diode 36 when the diode 210 outputs no signal. In other words, capacitor 214 is charged by generated DC current, diode 210 detects a point when the generated DC current stops; and the detection causes the chip 212 to operate to turn on (flash) the light-emitting diode 36. The energy stored in capacitor 214 is used to flash the light-emitting diode 36.

When the wheel is rotating (DC current has not stoped), chip 212 keeps light-emitting diode 36 from flashing. Light-emitting diodes 201a-201(c) emit light intermittingly when the wheel is rotating. When voltage generated in the form of a sine wave (AC current coming from the coil) is applied to a light-emitting diode, the light-emitting diode illuminates only momentarily when the voltage reaches a certain level, the light-emitting diode is not continuously illuminated.

Thus, the circuit shown in Fig. 7 of Lahos is provided to forcibly cause the light-emitting diode to blink, and does not disclose or suggest a circuit with having as a resonant frequency, a power-generation frequency determined by the positions where the magnets and the power generating coil are disposed, when the bicycle is pedaled at a predetermined speed.

Thus, Lahos does not disclose or suggest the claimed "a headlamp electrical circuit comprising a resonance circuit formed of the power-generating coil of the stator and a capacitor connected in series with the-power-generating coil, and having, as a resonant frequency, a power-generation frequency determined by the positions where the magnets and the power-generating coil are disposed, when the bicycle is pedaled at a predetermined speed."

Furthermore, Szaniszlo does not cure the above-noted deficiencies in Jung and Lahos.

Furthermore, with respect to the claimed "a power-generation frequency determined by the positions where the magnets and the power-generating coil are disposed, when the bicycle is pedaled at a predetermined speed," this is not the mere routine optimization of

variables. None of the cited references discloses that pedal speed and positions where the magnets and the power-generating coil are disposed are results effective variables. MPEP §2144.05 states

> A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) (The claimed wastewater treatment device had a tank volume to contractor area of 0.12 gal./sq. ft. The prior art did not recognize that treatment capacity is a function of the tank volume to contractor ratio, and therefore the parameter optimized was not recognized in the art to be a result- effective variable.). See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).

Furthermore, the outstanding Office Action fails to establish a motivation as to why a person of ordinary skill in the art would combine Jung and Lahos. In *In re Rouffet*, 149 F. 3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) the court stated "... the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed." Accordingly, Applicant respectfully requests that evidence of the motivation to combine be made of record or that the 35 U.S.C. §103(a) rejection be withdrawn.

The outstanding Office Action takes the position that Lahos inherently discloses the resonance circuit being for establishing resonance at a frequency synchronized with a certain relative speed of the magnets.[5] Applicant respectfully submits that the assertion of inherency

[5] Office Action, page 11.

is improper because the rejection fails to show "that the alleged inherent characteristic necessarily flows from the teachings of the applied prior art"[6]

The Office Action provides no rationale for this finding of inherency. "The fact that a certain result may occur or be present in the prior art is not sufficient to establish inherency of that result or characteristic."[7] "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'"[8] Because the Official Action provides no explanation of why Applicants' claimed features are inherent, Applicants submit the rejection is improper.[9]

With respect to the use of Official Notice on page 13 of the outstanding Office Action, it is noted that the Examiner may take official notice of facts outside of the record which are capable of instant and unquestionable demonstration as being "well-known" in the art. *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970). As set forth in MPEP § 2144.03, if an applicant traverses an assertion made by an Examiner while taking official notice, the Examiner should cite a reference in support of their assertion.

In addition, Applicant respectfully traverses those grounds for rejection relying of Official Notice. Applicants do not consider the features for which Official Notice were taken to be "of such notorious character that official notice can be taken." Therefore Applicants

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[6]See MPEP 2112 (emphasis in original) (citation omitted). See also same section stating that "[t]he fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result or characteristic," (emphasis in original). See also In re Robertson, 49 USPQ2d 1949, 1951 (Fed. Cir. 1999) ("[t]o establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill,'" citing Continental Can Co. v. Monsanto Co., 948 F2d 1264, 1268, 20 USPQ2d 1746, 1749 (Fed. Cir. 1991); and "[i]nherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient," Id. at 1269 (citation omitted)).

[7] *In re Rijckaert*, 9 F.3d 1531, 1534, 28 USPQ2d 1995, 1957 (Fed. Cir. 1993).
[8] *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999).
[9] MPEP § 2112, IV "Examiner must provide rationale or evidence tending to show inherency."

traverse this assertion. "The examiner should cite a reference in support of his or her position."[10]

Moreover, without the context by which the use of LEDs is known to the artisan, it is impossible to conclude that it would be obvious to combine such techniques with that of Jung and Lahos, as the context might itself provide reasons to rebut a *prima facie* case of obviousness. Therefore, it is respectfully requested that evidence of the use of LEDs and evidence of the motivation to combine be made of record or that the 35 U.S.C. §103(a) rejection be withdrawn.

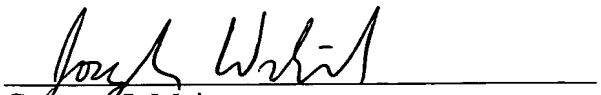
In view of the above-noted distinctions, Applicant respectfully submits that Claim 1 (and Claims 11-21 dependent thereon) patentably distinguish over Jung, Lahos, and Szaniszlo, taken alone or in proper combination. Claim 22 recites elements similar to those in amended Claim 1. Applicant respectfully submits that Claim 22 (and Claims 23 and 24 dependent thereon) patentably distinguish over Jung, Lahos, and Szaniszlo, taken alone or in proper combination, for at least the reasons stated for Claim 1.

[10]MPEP 2144.03, page 2100-129, left column, second full paragraph of MPEP 2144.03.

Consequently, in light of the above discussion and in view of the present amendment, the present application is believed to be in condition for allowance and an early and favorable action to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



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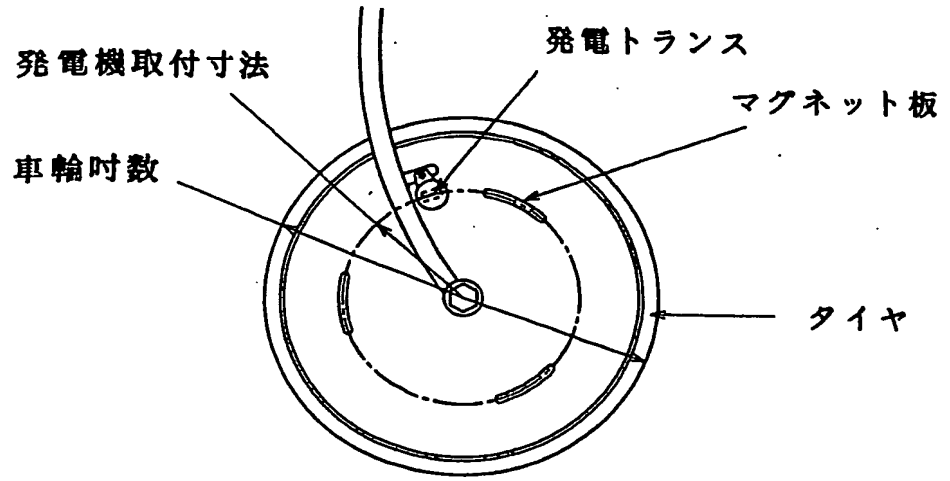
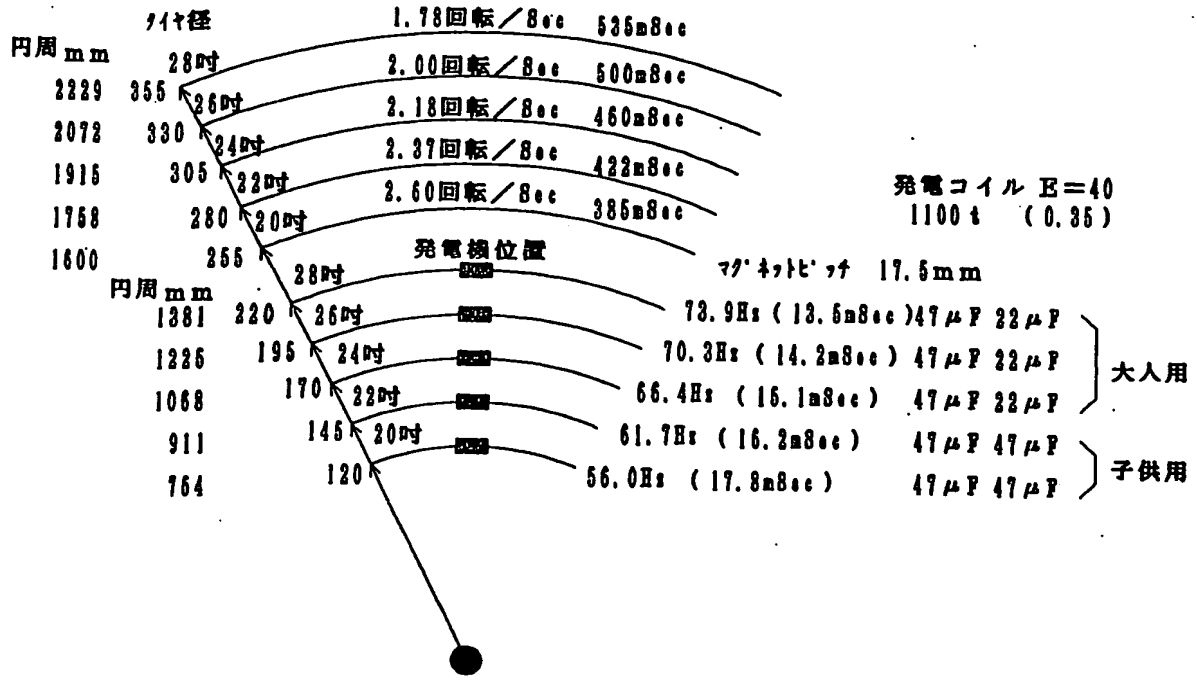
自転車吋数による発電部（発電トランス）取付位置相関関係図

発電機取付位置は自転車吋数により異なり標準速度における周速（N-S磁束の変化速度-周波数）を下記に示す。

又その算出根拠関係図を（付図 1）に示す。

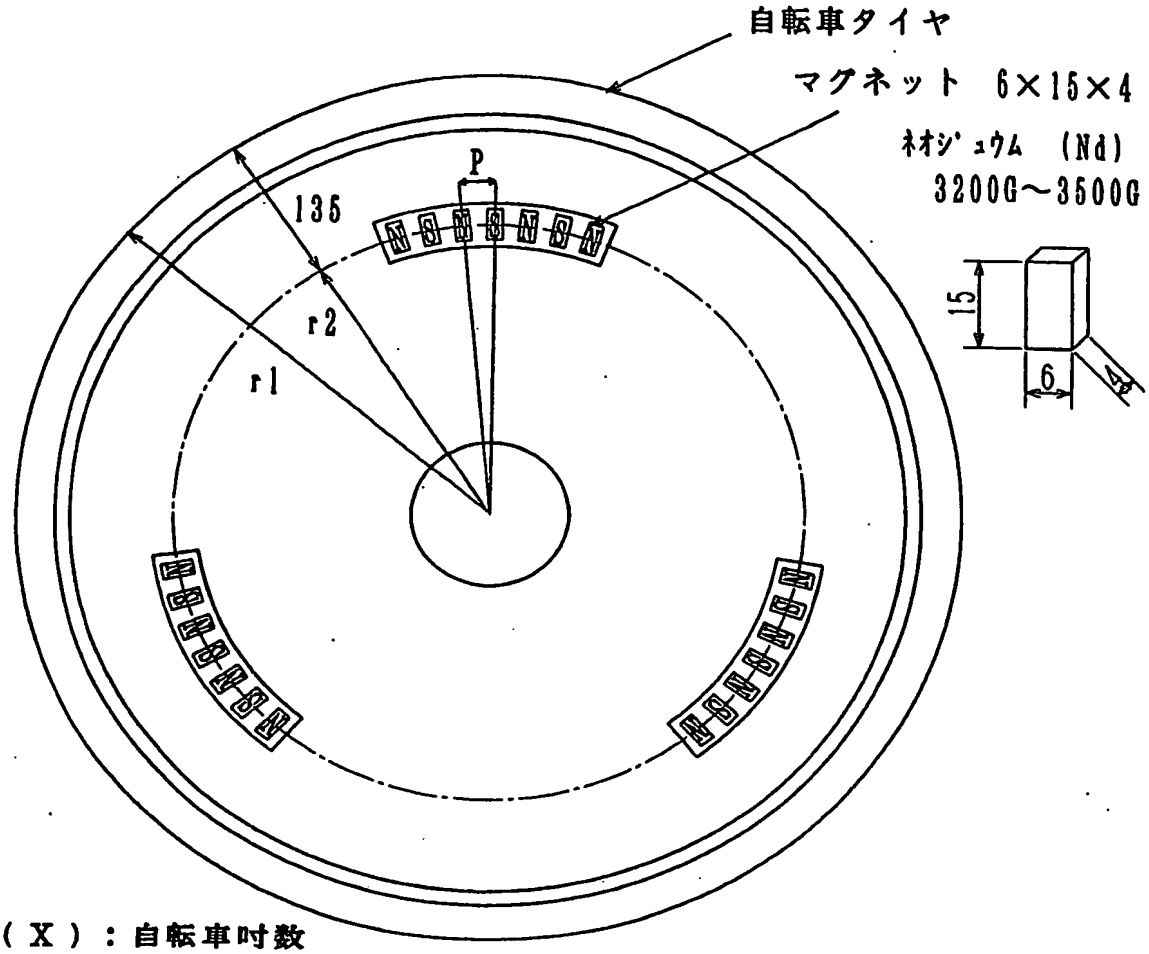
発電機取付た状態を示す





算出根拠関係図

図１



（Ｘ）：自転車吋数

ｒ１＝（Ｘ）吋／２×２５．４

ｒ２＝ｒ１－１３５　――――――（マグネット配列板取付位置）

Ｐ＝１７．５ｍｍ　――――――（マグネットピッチ）

Ａ＝自転車時速（ｋｍ）――――――（標準時速15ｋｍ／ｈ）

$$f = \frac{(A) \times 10^{6} \times 2\pi (r2)}{7200\pi (r1) \times 2 (P)}$$

車輪径（吋）	ｒ１	ｒ２	ｆ（ＨＺ）
２４	３０５	１７０	６６．４
２６	３３０	１９５	７０．３
２８	３５５	２２０	７３．９

自転車吋数による時速(km／h)、周波数関係表及び発電電流値

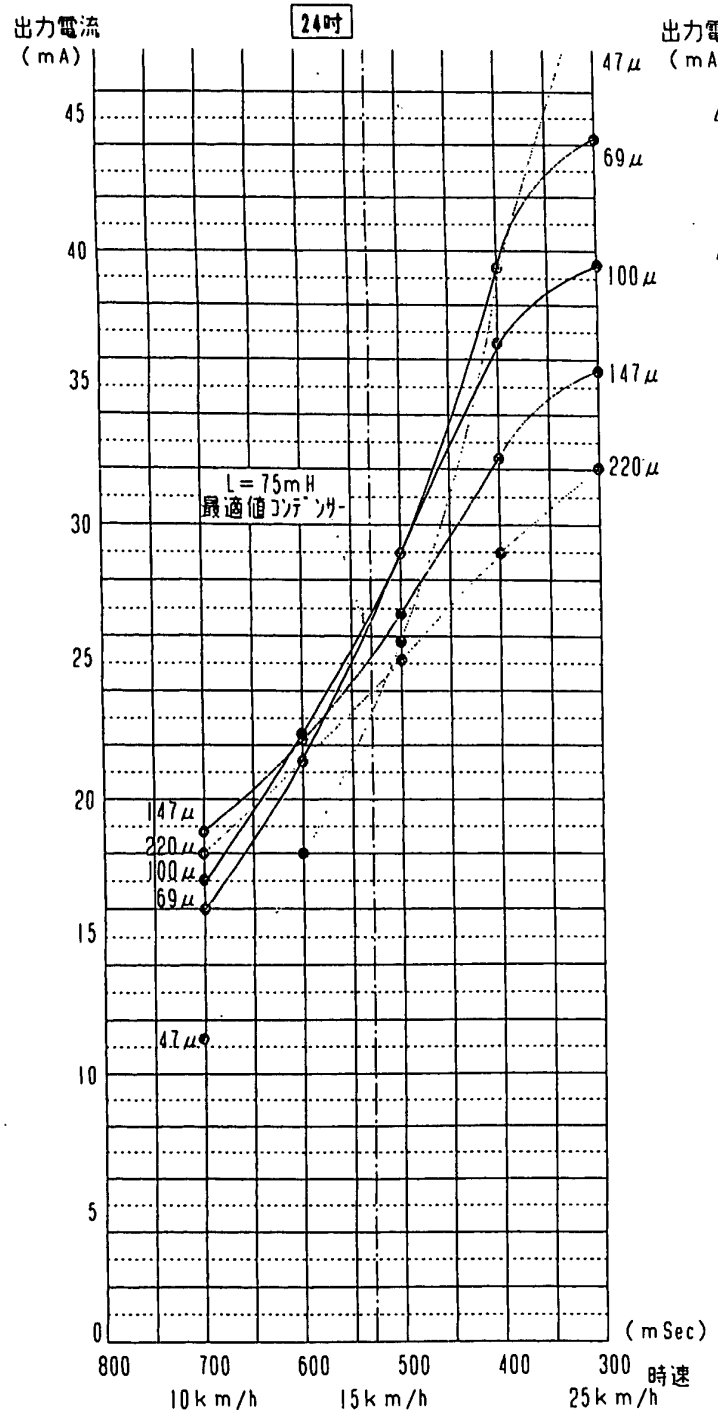
周期msec	時速 km/h			周波数 Hz			出力電流 mA		
	24吋	26吋	28吋	24吋	26吋	28吋	24吋	26吋	28吋
300	26.7	24.8	23.0	118.3	117.7	113.1	44.0	38.0	32.0
350	22.9	21.3	19.7	101.0	100.0	96.9	——	——	——
400	20.0	18.6	17.2	88.6	87.6	84.6	39.3	37.0	31.0
450	17.8	16.6	15.3	78.8	78.0	75.2	15km/h (26.8)	15km/h (30.0)	15km/h (29.6)
500	16.0	14.9	13.8	70.9	70.3	67.9	29.0	30.0	28.5
550	14.6	13.6	12.5	64.7	64.0	61.5	——	——	——
600	13.4	12.4	11.5	59.4	58.0	56.5	21.5	22.0	23.0
650	12.3	11.5	10.6	54.5	54.0	52.1	——	——	——
700	11.5	10.6	9.8	50.9	50.0	48.2	16.0	18.5	17.0

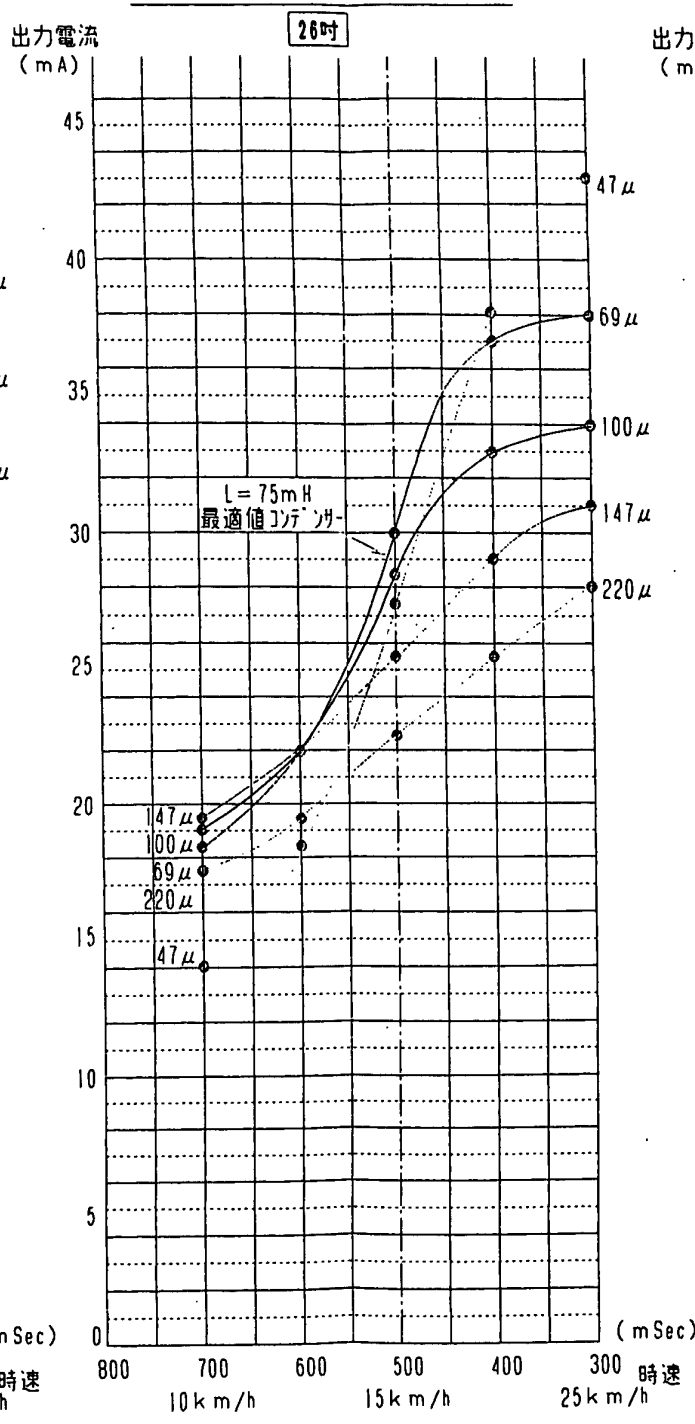
◍ 標準速度

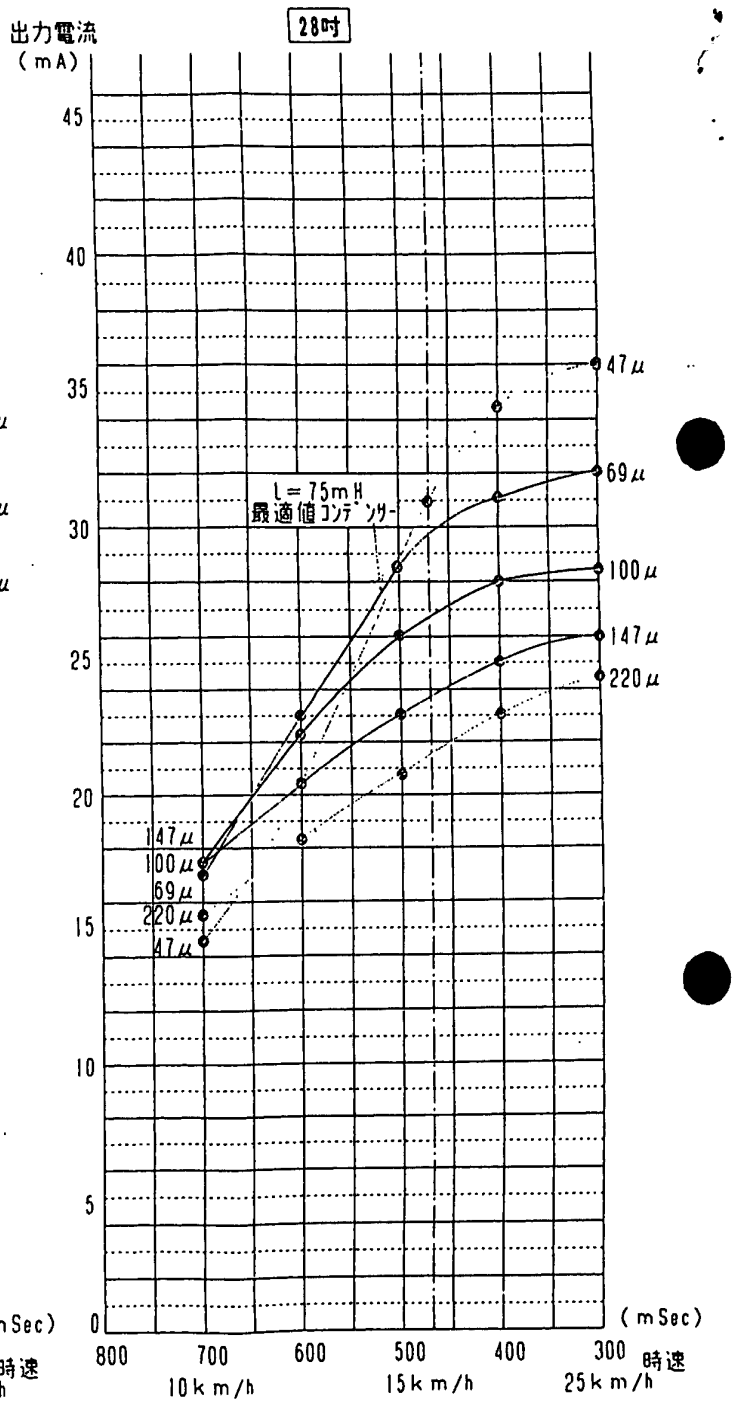
但し出力電流値データはL＝75mH C＝69μFによる

共振周波数 f＝70. 0Hz

時速（km/h）対出力電流特性







View showing the position where the power generator (power generation transformer) is mounted, for various bicycle sizes in inches

The power generator is mounted at a different position depending on the bicycle size in inches. Mounting positions and circumferential speeds (N-S magnetic flux changing speed v. frequency) at a standard bicycle speed are shown below. A view showing the basis of the calculations is also attached (Fig. 1).

Mounting of power generator

Power-generator mounting dimension

Power generation transformer

発電トランス

寸寸法

Magnet plate

Wheel size (in inches)

Tire

Tire diameter in inches

Rotations

Circumferential length (mm)

Power-generating coil
E = 40

Magnet pitch: 17.5 mm

Circumferential length (mm)

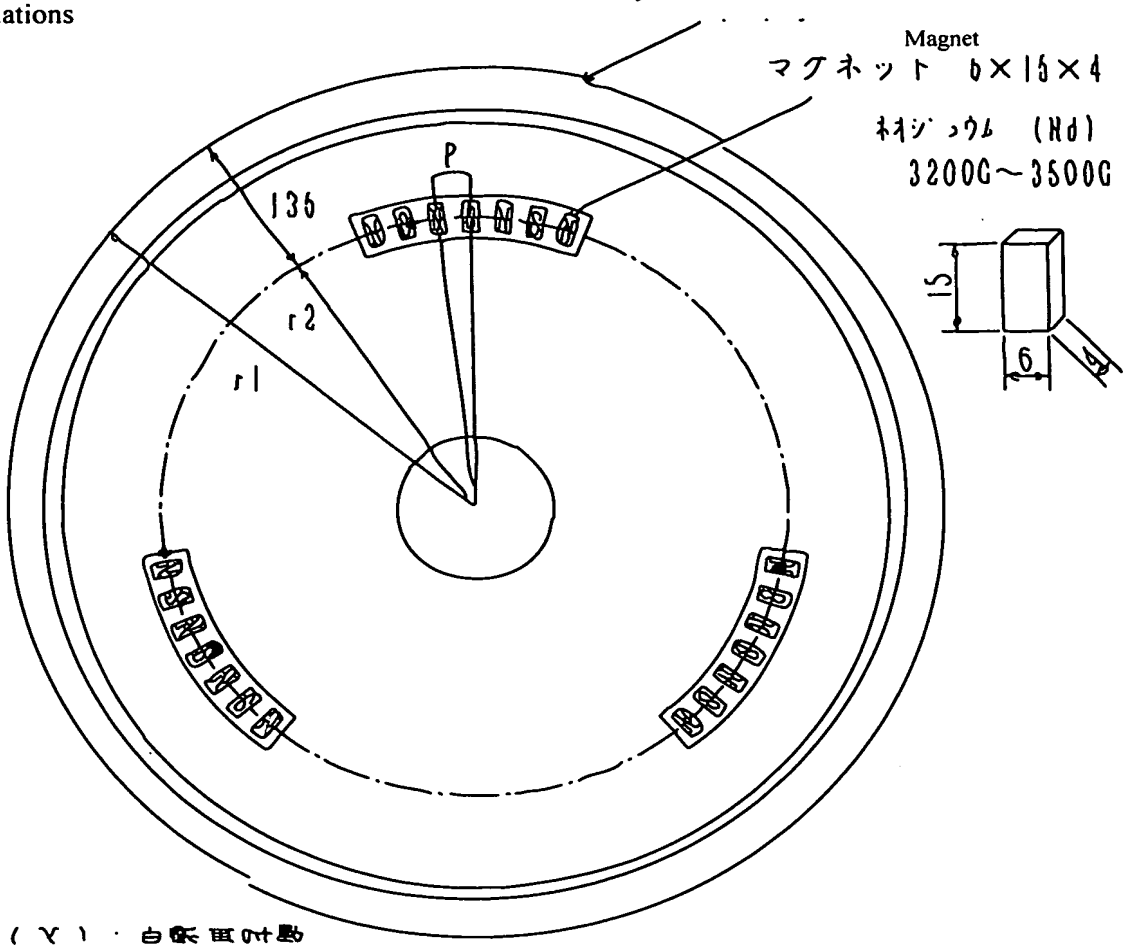
For adults

For children

Power-generator position

Figure 1

View showing basis of calculations



(X) :Bicycle size in inches

rl=(X)/2×25.4

r2= rl-135 _____ (Magnet-plate mounting position)

P= 17.5 mm _____ (Magnet pitch)

A = Bicycle speed (km/h) _____ (Standard speed: 15 km/h)

$$f = \frac{(A)\times 10^{6} \times 2\pi(r2)}{7200\,\pi(rl)\times 2(P)}$$

Wheel diameter (inches)	r l	r 2	f (Hz)
24	305	170	6 6.4
26	330	195	70.3
28	355	220	73.9

Speed (km/h), frequency, and power generation current for each bicycle size in inches

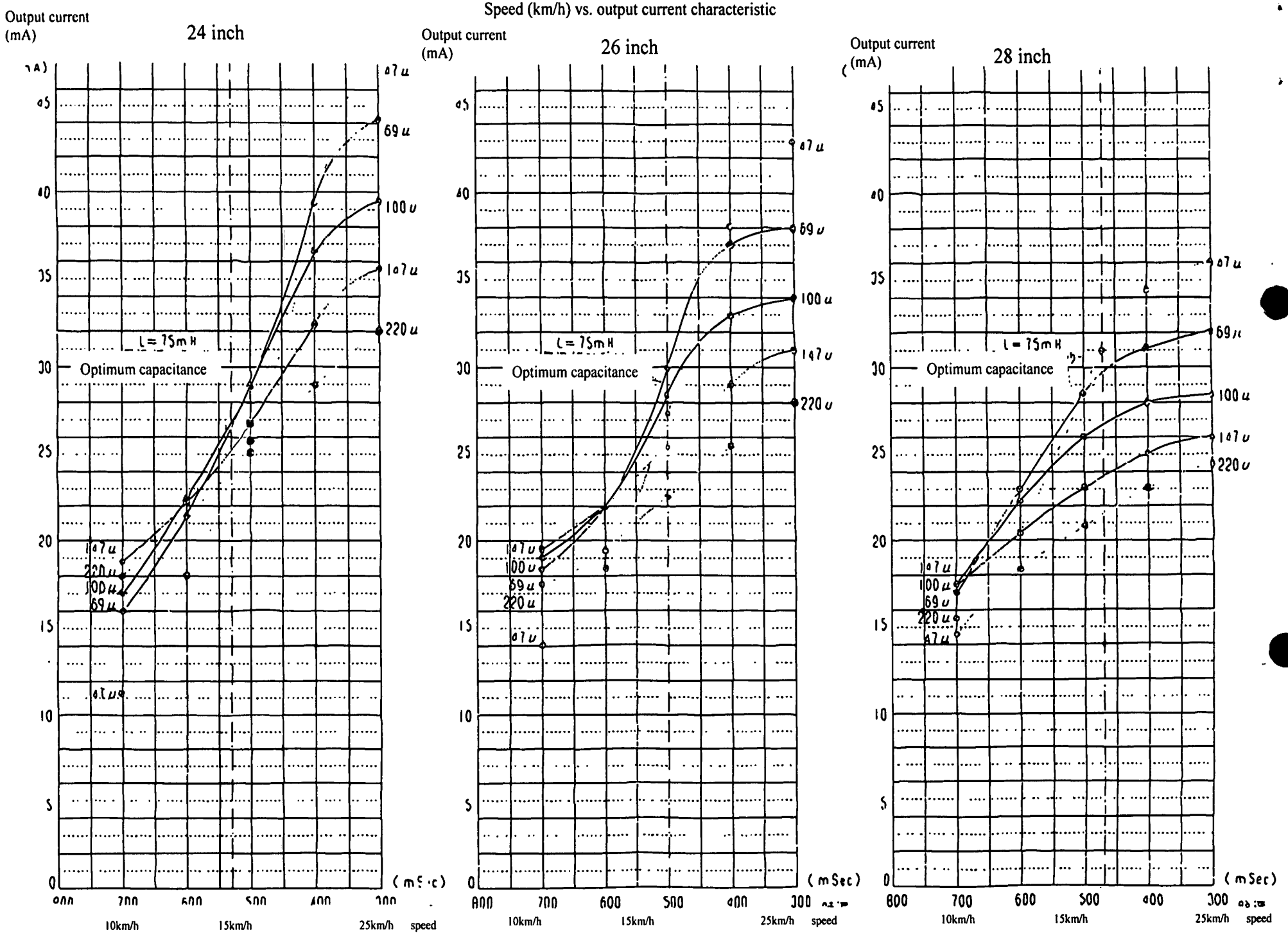
Period (ms)	Speed (km/h)			Frequency (Hz)			Output current (mA)		
	24 inches	26 inches	28 inches	24 inches	26 inches	28 inches	24 inches	26 inches	28 inches
300	26.7	24.8	23.0	118.3	117.7	113.1	44.0	38.0	32.0
350	22.9	21.3	19.7	101.0	100.0	96.9			
400	20.0	18.6	17.2	88.6	87.6	84.6	39.3	37.0	31.0
450	17.8	16.6	15.3	78.8	78.0	75.2	15km/h (26.8)	15km/h (30,0)	15km/h (29.6)
500	16.0	14.9	13.8	70.9	70.3	67.9	29.0	30.0	28.5
550	14.6	13.6	12.5	64.7	64.0	61.5			
600	13.4	12.4	11.5	59.4	58,0	56.5	21.5	22.0	23.0
650	12.3	11.5	10.6	54.5	54.0	52.1			-
700	11.5	10.6	9.8	50.9	50.0	48.2	16.0	18.5	17.0

◎ Standard speed

Output current: Measured at L = 75 mH and C = 69 μF

Resonant frequency (f): 70.0 Hz

Speed (km/h) vs. output current characteristic



JAPAN VEHICLE INSPECTION ASSOCIATION

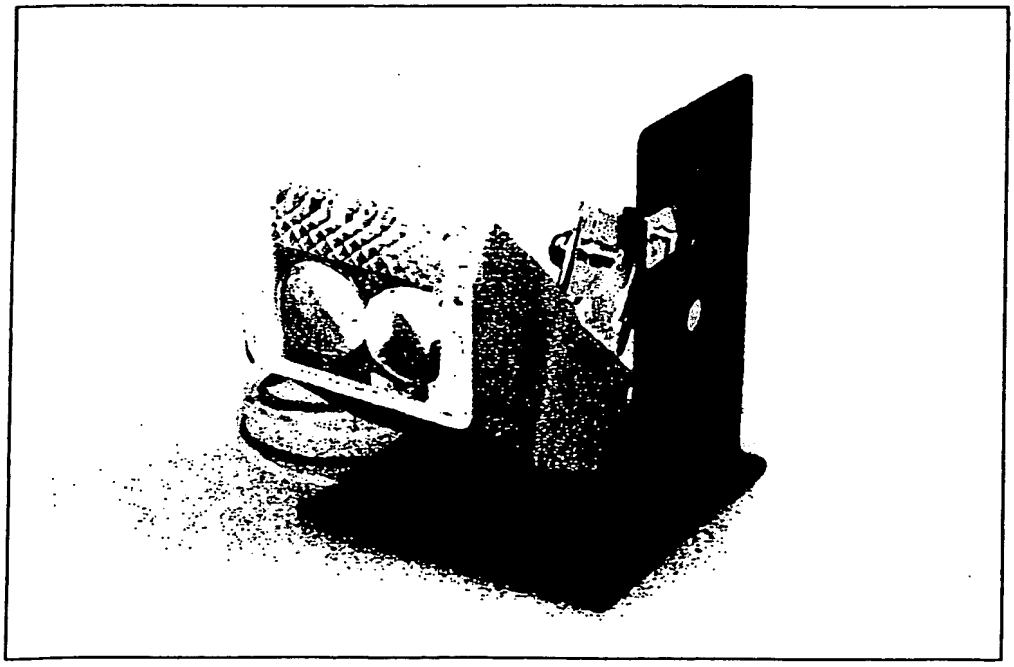
第 T21631 号
平成15年 3月 7日

試 験 成 績 書

あき電器株式会社 殿

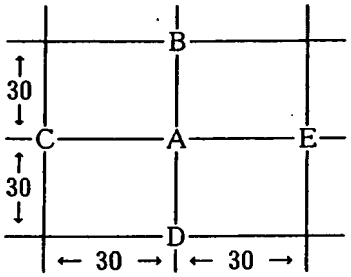
財団法人 日本車両検査協会

品名	自転車用前照灯	型式	ML1
製造者名	あき電器株式会社	仕様	白色LED
試験月日	平成13年 3月 5日	数量	－1－個
試験内容	JIS C 9502に準ずる	試験機器	直流定電流電源 照度計他
試験結果	別紙2／2による		



試 験 成 績 書

ＪＩＳ Ｃ９５０２ :1998に準ずる
品　　名：自転車用前照灯　　定　　格：（白色ＬＥＤ）
型　　式：ＭＬ１
製造者名：あき電器株式会社

試　験　項　目			試 験 結 果
5・前照灯の測光用件	5.1 光度	b）試験方法２（円形配光特性） 前照灯のＡ点の光度値は，400 cd以上であり，かつ，Ｂ，Ｃ，Ｄ及びＥの各点の平均値は，100 cd以上でなければならない。また，２灯式のものについては，１灯ごとにそれぞれの値を満足しなければならない。  	Ａ点　１３５　cd Ｂ点　９２．３cd Ｃ点　１１９　cd Ｄ点　１２４　cd Ｅ点　１２１ Ｂ，Ｃ，Ｄ及びＥ点の平均値　１１４　cd 試験電流　２５　mA
			Ａ点　１５４　cd Ｂ点　１０４　cd Ｃ点　１３６　cd Ｄ点　１４１　cd Ｅ点　１３８ Ｂ，Ｃ，Ｄ及びＥ点の平均値　１３０　cd 試験電流　３０　mA
	5.2 光線の色	前照灯から放射される光線の色は，白色光又は淡黄色光であって，次に規定する色度座標による色度の範囲内とする。 a）白色光 x　0.285　0.453　0.500　0.500　0.440　0.285 y　0.332　0.440　0.440　0.382　0.382　0.264 b）淡黄色光 x　0.466　0.477　0.541　0.524 y　0.550　0.515　0.451　0.442	x：0．３１５６ y：0．３２２４ 色：白色光 適　　合 試験電流　３０　mA

JAPAN VEHICLE INSPECTION ASSOCIATION

No. T21631

TEST RESULTS

March 7, 2003

To: Aki-Denki Kabushiki-kaisha

Tokyo Inspection Branch
Japan Vehicle Inspection Association

Product: Bicycle headlamp

Model: ML1

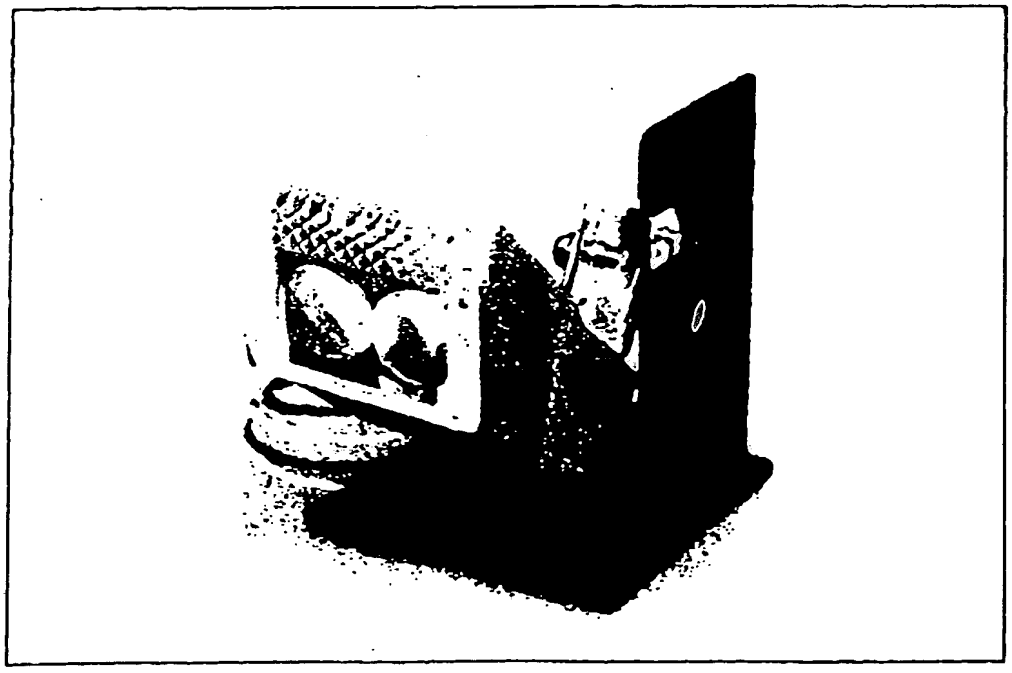
Manufacturer: Aki-Denki

Specifications: White LED

Test Date: March 5, 2001
Test Procedure: Conforming to JIS C 9502
Result: As Attached

Quantity: 1

Testing machine : Constant DC current power source, illuminometer, and others



Test Results

Conforming to JIS C9502, 1998
Product: Bicycle Headlamp
Model: ML1
Manufacturer: Aki Denki Kabushikikaisha

Rating: (White LED)

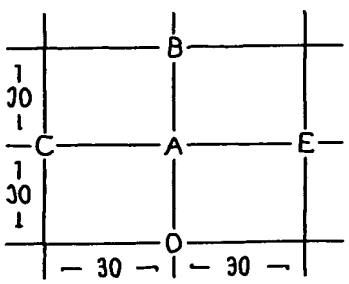
Test Item

Measured Values

5. Photometry Conditions for Headlamps

5.1 Luminous Intensity

b) The luminous intensity of the headlamp should be 400 cd or more at point A and the average luminous intensity at points B, C, D, and E should be 100 cd or more. When the headlamp has two lights, each light should satisfy the foregoing values.



Point A: 135 cd

Point B: 92.3 cd
Point C: 119 cd
Point D: 124 cd
Point E: 121

Average at points B, C, D, and E: 114 cd

Test current: 25 mA

Point A: 154 cd

Point B: 104 cd
Point C: 136 cd
Point D: 141 cd
Point E: 138

Average at points B, C, D, and E: 130 cd

Test current: 30 mA

5.2 Color of Light

The color of the ray radiated from the headlamp should be white or light yellow and should fall in the following chromaticity range specified by chromaticity coordinates.

a) White light

X	0.285	0.453	0.500	0.500	0.440	0.285
Y	0.332	0.440	0.440	0.382	0.382	0.264

b) Light yellow

X	0.466	0.477	0.541	0.524
Y	0.550	0.515	0.451	0.442

x: 0.3156
y: 0.3224

Color: White
Conformed to this requirement

Test current: 30 mA